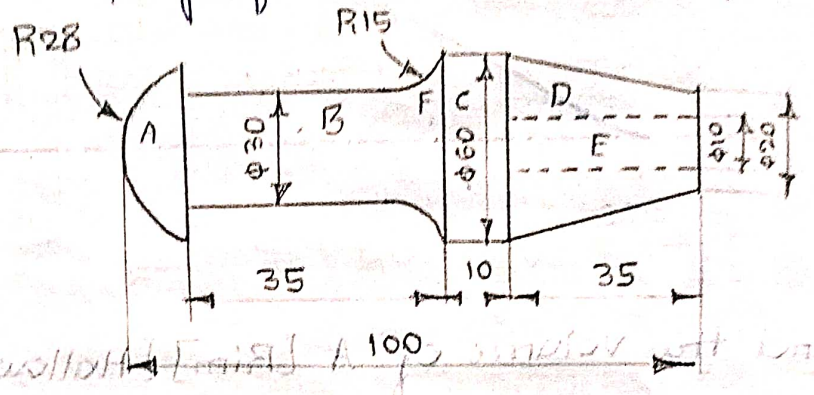
8. Determine the weight of 100 articles of mild steel as shown figure. Take the density of mild steel as 7.8gm/cc



i) To find the volume of A [Segment of a sphere]

$$V_A = \frac{\pi}{6} h^2 [3D - 2h] \longrightarrow \frac{\pi}{6} \times 20^2 [3 \times 56 - 2 \times 20]$$

$$\therefore \boxed{V_A = 26,808.25 mm^3}$$

ii) To find the volume of C [Cylinder]

$$V_C = \frac{\pi}{4} \times D^2 \times l \longrightarrow \frac{\pi}{4} \times 60^2 \times 10$$

$$\therefore \boxed{V_C = 28,274.33 mm^3}$$

iii) To find the volume of D [Frustum of a cone]

$$V_D = \frac{\pi}{4} [d_1^2 + d_2^2 + (d_1 \times d_2)] \frac{h}{3}$$

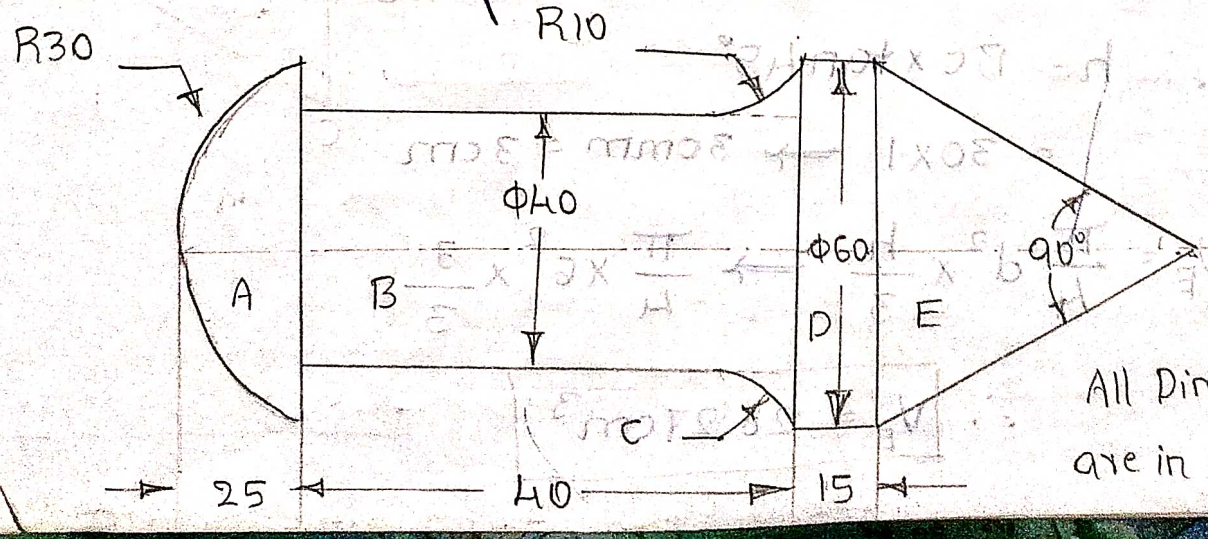
$$\longrightarrow \frac{\pi}{4} [60^2 + 20^2 + (60 \times 20)] \frac{35}{3}$$

$$\therefore \boxed{V_D = 47,647.48 mm^3}$$

iv) To find the volume of E [Cylinder]

$$V_E = \frac{\pi}{4} \times D^2 \times l \longrightarrow \frac{\pi}{4} \times 10^2 \times 35 = \boxed{2,748.89 mm^3}$$

9. Determine the weight & cost of 200 articles of MS as shown in fig. Assuming the suitable density and the material cost at ₹121- per kg.



Data:

No. of articles = 200

$\rho = 7.8 gm/cm^3$

material cost = ₹ 12/kg.

Solution:

i) To find the volume of A [Segment of a sphere]

$$V_A = \frac{\pi}{6} h^2 [3D - 2h] \rightarrow \frac{\pi}{6} \times 2.5^2 \times [3 \times 6 - 2 \times 2.5]$$

$$\therefore \boxed{V_A = 42.54 cm^3}$$

ii) To find the volume of B [Cylinder]

$$V_B = \frac{\pi}{4} \times D^2 \times l \Rightarrow \frac{\pi}{4} \times 4^2 \times 4 = \boxed{50.26 cm^3}$$

iii) To find the volume of C

Mean dia $= \frac{60+40}{2} = 50mm = \boxed{5cm}$

$\therefore V_c = 0.215 \times R^2 \times$ mean dia $= 0.215 \times 1^2 \times 5$

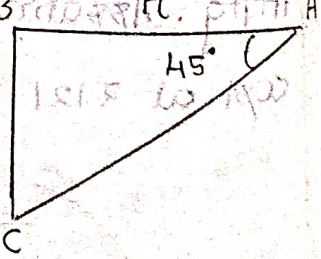
$$\therefore \boxed{V_c = 1.075 cm^3}$$

iv) To find the volume of D [Cylinder]

$$\therefore V_D = \frac{\pi d^2}{4} \times l \rightarrow \frac{\pi \times 6^2}{4} \times 1.5$$

$$\boxed{V_D = 42.41 cm^3}$$

v) To find the volume of E [Cone]



$$\tan 45 = \frac{AC}{BC} = \frac{h}{30}$$

$\therefore h = BC \times \tan 45°$

$= 30 \times 1 \rightarrow 30mm = 3cm$

$$\therefore V_E = \frac{\pi}{4} d^2 \times \frac{h}{3} \rightarrow \frac{\pi}{4} \times 6^2 \times \frac{3}{3}$$

$$\therefore \boxed{V_E = 28.27 cm^3}$$

∴ Total volume = $V_A + V_B + V_C + V_D + V_E$

$\longrightarrow 42.54 + 50.26 + 1.07 + 42.41 + 28.27$

$\boxed{V = 164.55 cm^3}$

vii) Weight

$V \times \rho \Rightarrow 164.55 \times 7.8 = 1283.5 gm$

$\Longrightarrow \frac{1283.5}{1000} = \boxed{1.28 kg.}$

viii) Cost of one article

$\longrightarrow 1.28 \times 12 = \boxed{₹ 15.36/-}$

ix) Cost of 200 articles.

$\longrightarrow 200 \times 15.36 = \boxed{₹ 3072/-}$